(7) $\cos 2A = 2\cos^2 A - 1$

$\cos 2\theta = \frac{3}{5}$

$\frac{3}{5} = 2\cos^2\theta - 1$

$+1 \quad +1$

$\frac{8}{5} = 2\cos^2\theta$

$\frac{\frac{8}{5}}{2} = \frac{2\cos^2\theta}{2}$

$\sqrt{\frac{8}{10}} = \sqrt{\cos^2\theta}$

$\frac{\sqrt{10}}{\sqrt{10}}\frac{\sqrt{8}}{\sqrt{10}} = \cos\theta$

rationalize

$\frac{\sqrt{80}}{10} = \cos\theta$

$\frac{\sqrt{16}\cdot\sqrt{5}}{10} = \cos\theta$

$\frac{4\sqrt{5}}{10} = \cos\theta$

$\frac{2\sqrt{5}}{5} = \cos\theta$

(17) $\cos^2 15 - \sin^2 15 = \cos 2(15^\circ)$

$= \cos 30^\circ$

$= \frac{\sqrt{3}}{2}$

(11) $\cos 2\theta$, given $\sin\theta = \frac{2}{5}$, $\cos < 0 \rightarrow$ quad. II

$\cos 2\theta = 1 - 2\sin^2\theta$

$\cos 2\theta = 1 - 2\left(\frac{2}{5}\right)^2$

$\cos 2\theta = 1 - 2 \cdot \frac{4}{25}$

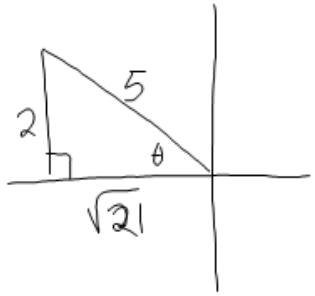
$\cos 2\theta = \frac{25}{25} - \frac{8}{25}$

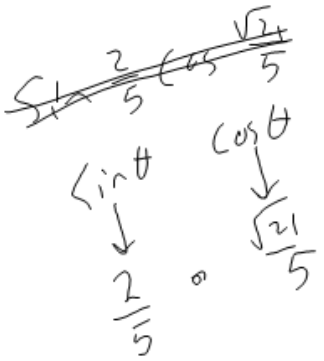
$\cos 2\theta = \frac{17}{25}$

$\sin 2A = 2\sin A \cos A$

$= 2\left(\frac{2}{5}\right)\left(\frac{\sqrt{21}}{5}\right)$

$= -\frac{4\sqrt{21}}{25}$



5.5 #37, 40, 43, 45

(87) $(\sin x + \cos x)^2 = \sin 2x + 1$

$\sin^2 x + \sin x\cos x + \sin x\cos x + \cos^2 x$

$\sin^2 x + 2\sin x\cos x + \cos^2 x$

$\sin 2x$

$1 + \sin 2x$

(40)

$$\sin 2x = \frac{2\tan x}{1+\tan^2 x}$$

$$\sin(A+A) = \sin A\cos A + \cos A \sin A$$

$$= 2\sin A\cos A$$

$$= \frac{2\frac{\sin x}{\cos x}}{\sec^2 x}$$

$$= \frac{2\frac{\sin x}{\cos x}}{\frac{1}{\cos^2 x}} \longrightarrow 2\frac{\sin x}{\cos x}\cdot\frac{\cos^2 x}{1} = 2\sin x\cos x$$

$$= \sin 2x$$

$\sin 4A = 4 \sin A \cos A \cos 2x$

$\sin 2(2A)$

$2 \sin 2A \cos 2A$

$2 \cdot 2 \sin A \cos A \cos 2A$

$4 \sin A \cos A \cos 2A$

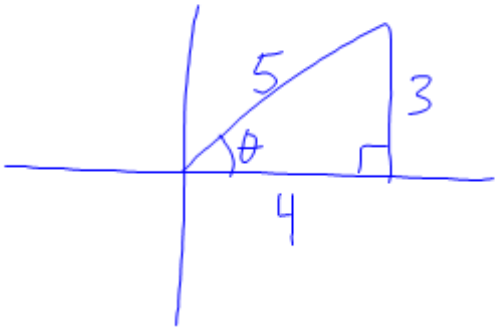
$\sin 2A = 2 \sin A \cos A$

(45) $\tan(\theta-45) + \tan(\theta+45) = 2\tan 2\theta$

$$\frac{\tan\theta - \tan 45}{1+\tan\theta\tan 45} + \frac{\tan\theta + \tan 45}{1-\tan\theta\tan 45}$$

$$\frac{1-\tan\theta}{1-\tan\theta}\cdot\frac{\tan\theta-1}{1+\tan\theta} + \frac{\tan\theta+1}{1-\tan\theta}\cdot\frac{\tan\theta+1}{\tan\theta+1}$$

$\sin\theta = \frac{3}{5}$, Quad. 1




find $\sin 2\theta$

$= 2\sin A\cos\theta$

$= 2\left(\frac{3}{5}\right)\left(\frac{4}{5}\right)$

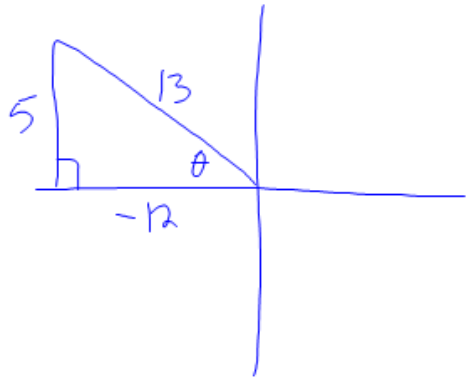
$= \frac{24}{25}$

$\sin(A+B) = \sin A\cos B + \cos A\sin B$

$\sin(2A) = \sin(A+A) = \sin A\cos A + \cos A\sin A$

$\sin(2A) = 2\sin A\cos A$

Find $\sin 2\theta$, given $\cos\theta = -\frac{12}{13}$ $\quad \sin\theta > 0$




$$\sin 2\theta = 2\sin\theta\cos\theta$$
$$= 2\left(\frac{5}{13}\right)\left(\frac{-12}{13}\right)$$

$$\sin 2\theta = \frac{-120}{169}$$

$$\cos 2\theta = \cos^2\theta - \sin^2\theta$$
$$= \left(\frac{-12}{13}\right)^2 - \left(\frac{5}{13}\right)^2$$
$$= \frac{144}{169} - \frac{25}{169} = \frac{119}{169}$$

$2\cos^2 15° - 1 \Rightarrow \cos 2x$

$= \cos(2 \cdot 15)$

$= \cos(30)$

$= \frac{\sqrt{3}}{2}$

---

Find $\cos x$ if $\cos 2x = \frac{2}{3}$ $\qquad \cos^2 x = (\cos x)^2$

$\cos 2x = 2\cos^2 x - 1$

$\frac{2}{3} = 2\cos^2 x - 1$

$+1 \qquad +1$

$\frac{1}{2} \cdot \frac{5}{3} = 2\cos^2 x \cdot \frac{1}{2}$

$\sqrt{\frac{5}{6}} = \sqrt{\cos^2 x}$

$\frac{\sqrt{6}}{\sqrt{6}} \frac{\sqrt{5}}{\sqrt{6}} = \cos x$

$\frac{\sqrt{30}}{6} = \cos x$

Read

5.6

#19-22, 33-35, 51, 53